Remarks

This is in response to the Office Action dated July 3, 2003. The Office Action rejected claims 9-13 and 21 under 35 U.S.C. §112 ¶2. The Office Action rejected claims 1, 2, 4, 5, 7, 8, 18, 19 and 25-28 under 35 U.S.C. §103(a) as being obvious over applicants admitted prior art (AAPA) in view of either one of U.S. Patent No. 6, 324, 184 (Hou et al.) or U.S. Patent No. 5,247,516 (Bernstein at al.). Claim 6 was rejected under 35 U.S.C. §103(a) as being obvious over AAPA in view of either one of Hou et al. or Bernstein at al., and further in view of U.S. Patent No. 4,914,650 (Sriram). Claims 3 and 20 were rejected under 35 U.S.C. §103(a) as being obvious over AAPA in view of either one of Hou et al. or Bernstein at al., and further in view of U.S. Patent No. 5,400,044 (Thomas). Claims 9-11, 13, 21 and 23-24 were rejected under 35 U.S.C. §103(a) as being obvious over AAPA in view of U.S. Patent No. 6,510,162 (Fijolek et al.) and either of Hou et al. or Bernstein at al. Claim 12 was rejected under 35 U.S.C. §103(a) as being obvious over AAPA in view of Fijolek et al. and either of Hou et al. or Bernstein at al. and further in view of U.S. Patent No. 5,295,140 (Crisler et al.). Claim 22 was rejected under 35 U.S.C. §103(a) as being obvious over AAPA in view of either one of Hou et al. or Bernstein et al and further in view of Crisler et al. Claims 14 and 16 were rejected under 35 U.S.C. §103(a) as being obvious over Fijolek et al. Claim 15 was rejected under 35 U.S.C. §103(a) as being obvious over Fijolek et al. in view of AAPA. Claim 17 was rejected under 35 U.S.C. §103(a) as being obvious over Fijolek et al. and AAPA and further in view of Crisler et al. Claims 1, 18 and 28 were rejected under 35 U.S.C.

§103(a) as being obvious over Fijolek et al. in view of either one of Hou et al. or Bernstein at al.

In response, Applicant has amended claims 1, 3, 5, 6, 9, 10, 11, 18, 21 and 28. Claims 2, 14-17 and 19 are cancelled herein. Claims 29-35 were cancelled without disclaimer or prejudice in an earlier filed Response to Election/Restriction Requirement under 35 U.S.C. 121. Claims 1, 3-13, 18 and 20-28 are currently pending and remain for consideration.

In response to the rejection under 35 U.S.C. §112 ¶2, Applicant has amended claims 9, 10 and 21. These amendments address the Office Action's reasons for rejecting these claims. Applicant requests that the §112 rejection be withdrawn in view of these amendments.

The present invention is directed to a technique for reducing jitter in a bi-directional cable-access system. One of the problems with upstream channel communications in a cable-access system is illustrated in Fig. 4 of the present application and described in the specification at page 7. As seen from Fig. 4 and the accompanying description, jitter occurs as a result of shifting time slots within a nominal grant interval. As a result of this shift, voice packets are not received at their expected time, which leads to so-called jitter, or packet delay variation, and an accompanying degradation of service. The present invention solves this problem by establishing jitter windows within the voice region of a transmission frame so as to maintain the packet delay within an acceptable tolerance. This aspect of the invention is described, for example, in conjunction with Fig. 2A at page 13 of the specification. As can be seen, the establishment of appropriate non-overlapping jitter windows which collectively cover the entire voice regions, results in

limiting the jitter to the duration of the jitter window. Thus, even if there is shifting of time slots, such shifting will remain within an assigned jitter window, and as such, the packet delay variation is limited by the size of the jitter window.

Claim 1 has been amended to more particularly point out and claim this aspect of the invention. For example, claim 1 now contains the limitations of a "frame comprising one or more voice regions", and "two non-overlapping jitter windows ... collectively covering the entire one or more voice regions", where the "jitter windows are established such that packet delay variation of calls being transmitted within each of said jitter windows is maintained within an acceptable tolerance".

The cited art does not disclose nor suggest the invention as claimed in amended claim 1. Since the Office Action relied primarily in Hou et al. and Bernstein et al. as teaching "jitter windows", Applicants arguments are directed in particular to these references. First, Hou et al is directed to dynamic bandwidth allocation for a communication network. The Office Action cited Hou et al. at col. 8, lines 63-65 as disclosing jitter windows. However, that section of Hou et al. merely discloses the allocation of bandwidth (which may correspond to a number of slots per frame). Thus, while Hou et al. discloses allocation of slots in a frame to a user, it does not disclose the establishment of jitter windows to maintain packet delay variation within an acceptable tolerance, as currently claimed in amended claim 1. As such, Applicant submits that claim 1 is allowable over Hou et al.

Second, Bernstein et al. is directed to the transmission of information between subscribers in an integrated services network. The Office Action cites the Abstract of Bernstein et al. as well as the figure on the cover page, which corresponds to Fig. 7 of

Bernstein et al. The Abstract of Bernstein et al. discloses the transmission of traffic component types using a variable size composite frame. The cited Fig. 7 of Bernstein et al. merely shows a block diagram representation of a virtual circuit path with synchronous frame launching according to the technique of Bernstein et al. Nothing in the Abstract nor Fig. 7 discloses nor suggests the establishment of jitter windows to maintain packet delay variation within an acceptable tolerance as described above. As such, Applicant submits that claim 1 is allowable over Bernstein et al.

The Office Action rejected independent claims 18 and 28 for the same reasons as claim 1. Claims 18 and 28 have been amended by Applicant in a manner similar to the amendment to claim 1. As such, Applicant submits that amended claims 18 and 28 are allowable over the cited art for the same reasons as described above in connection with claim 1.

Independent claim 9 is directed to a method for allocating a new upstream channel in accordance with the present invention. As described in the application, it is sometimes necessary to process an Immediate Upstream Channel Change (IUCC) procedure. For example, as described on page 16 of the specification, when a request for a new call is made, but all time slots in the currently assigned channel are occupied, an IUCC is processed in order to move to a new channel which has available bandwidth to handle the additional call. In accordance with one embodiment of the invention, as claimed in amended claim 9, the assignment of a new channel is performed in a manner which makes use of jitter windows and therefore maintains any resulting jitter within appropriate tolerances.

Referring to claim 9, that claim as amended , claims a method for allocating a new upstream channel where "a current upstream channel is carrying one or more existing voice connections, each of said existing voice connections being assigned to one or more jitter windows". Further, in accordance with claim 9, time slots are assigned in the new upstream channel such that "voice packets from said one or more existing voice connections maintain jitter window assignments in the new upstream channel corresponding to the jitter window assignments in the current upstream channel". By maintaining the jitter window assignments during the assignment of a new channel, jitter is controlled.

In rejecting the original claim 9, the Office Action cited Fijolek et al. Fijolek et al. is directed to managing channel usage in a data over cable system having more than one data channel. However, none of the cited sections of Fijolek et al. describe the invention as claimed in amended claim 9. Fijolek et al. at col. 9, lines 25+ describes the cable modem scanning for an available data channel. There is nothing in the cited section which describes the assignment of a new upstream channel to carry voice and the claimed aspect of maintaining jitter window assignments in the new upstream channel corresponding to the jitter window assignments in the original channel. Similarly, the claimed subject matter is not shown in the cited section of Fijolek et al. at col. 19, lines 10-20. That section, while discussing changing the upstream channel, does not address the jitter problem and does not disclose the particular technique for changing the upstream channel as claimed in claim 9. The mere switching to another upstream channel as disclosed in Fijolek et al. in now way suggests claim 9's particular technique

for switching upstream channels while reducing jitter. Similarly, neither Hou et al. nor Bernstein et al. disclose the method of claim 9.

For the reasons described above, all independent claims 1, 9, 18 and 28 are allowable over the cited art. All remaining claims are dependent upon an allowable independent claim and are therefore also allowable. Further the dependent claims add additional allowable subject matter as follows. Claims 3 and 20 are directed to a method and network, respectively, in which the length of the jitter windows are established in a particular manner as claimed. The Office Action cites Thomas is rendering these claims obvious. However, Thomas is wholly unrelated to the present invention. Thomas is directed to a raster scan video display device. With respect to the cited section of Thomas, that section is directed to a method of determining the "frame step" as described therein. However, the "frame step" of Thomas is unrelated to the data frames, time slots, or regions of the present invention. Instead, Thomas is related to the non-analogous art of raster scan display devices and the "frame step" of Thomas relates to the amount by which successive frames of the display are to be shifted (see the definition of "frame step" in Thomas at col. 7, lines 42-44). Applicant submits that it is improper to combine Thomas with Hou et al. or Bernstein et al. Even if such a combination was proper, it would not suggest the invention of claims 3 and 20.

Dependent claims 5 adds the limitation that the jitter windows are established in one voice region. Since neither Hou et al. nor Bernstein et al. disclose jitter windows for the reasons described above, neither do they disclose jitter windows in one voice region.

Dependent claims 10 and 24 are directed to a particular technique for selecting an upstream channel in accordance with certain criteria. However, the Office Action cites

no art which discloses this particular technique, but instead merely makes the statement that such a technique would be obvious. Applicant asserts that the Office Action has failed to make a prima facie showing of obviousness with respect to claims 10 and 24 because no art has been cited which discloses the claimed technique.

Claims 11 and 21 are directed to a particular technique for selecting a new upstream channel. The Office Action cites Fijolek et al. at col. 9, line 28 as disclosing first fit. However, the cited section of Fijolek et al. merely shows the scanning of data channels and locking on to the first one which contains certain characteristics. This does not render claims 11 and 21 obvious.

Claims 12 and 22 are directed to a particular technique for assigning a time slot. The Office Action cites Crisler et al. at col. 6, lines 65+ as disclosing random time slot assignment. However, the cited section of Crisler et al. discloses waiting for the occurrence of a random access time slot on an inbound communication channel. Waiting for a random access time slot is not the same as randomly assigning an idle time slot. As such, Crisler et al. does not render claims 12 and 22 obvious.

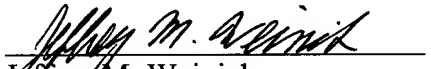
For the foregoing reasons, the cited art does not render the pending claims obvious.

No new matter has been added by this amendment. The subject matter added to claims 1, 18 and 28 directed to the jitter windows collectively covering the voice regions is supported by the specification as filed at least at page 13, lines 16-19. The subject matter added to claims 1, 18 and 28 directed to establishing the jitter window such that packet delay variation is maintained within an accepted tolerance is supported by the specification at least at page 6, lines 20-22 and page 13, lines 4- 20. The subject matter

added to claim 9 is supported by the specification as filed at least at page 15, lines 16-17 and page 20, lines 2-9. As such, Applicant submits that no new matter has been added to this application.

Reconsideration and allowance of all pending claims is respectfully requested.

Respectfully submitted,



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